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Conference Proceedings

Theme: 2. Challenges and strategies involved in embracing mobile innovation for libraries

Title: librARy and e-leARning: further adventures with Augmented Reality

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Institution: University of Bath, UK.

1. Introduction

Augmented Reality (AR) is defined by Wikipedia (2014) as 'a live direct or indirect view of a physical, real-world environment whose elements are **augmented** (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data'.

The use of AR in the worlds of entertainment and commerce has increased rapidly in the last few years, bringing to life objects, printed matter and even locations by enriching what we see around us with additional digital resources. In effect, the use of AR creates a virtual layer on top of our actual situation to enhance our experience through the addition of rich media.

Several brands are using AR to add these virtual layers to physical objects, notably the UK retailers Tesco and Marks & Spencer, who have included AR in their customer magazines to offer readers the opportunity to view videos of recipes being turned into meals, simply by holding their smartphone or tablet over a particular image. More recently, we have started to see educational institutions exploring the possibilities that AR offers not only for public engagement and marketing, but also for enhancing teaching and the student learning experience.

2. Project partnerships

During the 2012-13 academic year at the University of Bath, the Library and the e-Learning teams worked collaboratively with the Students' Union, the Public Engagement department and others to experiment with AR in a University setting; using agile development techniques to create applications for its use and to engage the University community with this emerging technology. The collaborative partnerships within this project team quickly established a group dynamic of cooperation rather than competition. In particular, the direct involvement of the 'student voice' coming from the Students' Union added to the project's credibility at the highest levels within the University and was especially helpful in generating ideas and priorities.

The project had little financial resource on which to call and it was therefore important for us to draw on the expertise and enthusiasm of the collaborators and on their networks and knowledge. We built on previous experience of being an early adopter of QR codes (Robinson, 2010). We also used commercial contacts in the city of Bath who were already experimenting with AR, and drew upon the expertise of colleagues at MIMAS in Manchester¹ including their AR Project Manager Matt Ramirez. All were generous with their time and advice.

As a project team we had some technical expertise, but we were also mindful to share what we were to learn and so determined to ensure technical applications were as straightforward as possible, and not overly reliant on programming experience.

3. Project scope

It was our intention to experiment with the possibilities of AR. We also wished to discuss our findings with various members of the university community, all of whom would have a range of priorities and interests. We therefore considered it to be important for the project to have a broad scope and so this work concentrated on three distinct strands:

- **augmenting the campus:** creating a virtual map of the campus to highlight the location and availability of printers, photocopiers and computers for student use
- **augmenting an object:** bringing a printing press 'to life' through use of video
- **augmenting research:** focussing on a poster exhibition showcasing current research at the University, to intensify public engagement with it.

In particular, we were anxious to be able to use AR technology to enhance the student learning experience and to stimulate and share good practice around the potential use of AR, not only within our institution but also across our sector.

4. AR tools

Our first task was to choose an appropriate tool for creating and viewing the additional, augmented layers. In making this decision, we were keen to identify one that would work with both iOS and Android devices and offer the same experience to both groups of users. Having limited technical resources to support the project, another important requirement was for an application that was easy to use and did not need specialist developer involvement.

Looking across the sector as we started our explorations into how we could use AR in education, we found a number of institutions at a similar stage to us using a range of AR applications, including BlippAR, LayAR, Junaio and Wikitude. The one that stood out for us though, primarily because of its simplicity, was Aurasma.

Signing up for a free account with the Aurasma Studio gave us access to the online development environment. From this, we were able to put together images, videos and web links to create the augmented layers for each of our projects. At the user end, a free app could be downloaded for both iOS and Android devices to enable the end result to be viewed.

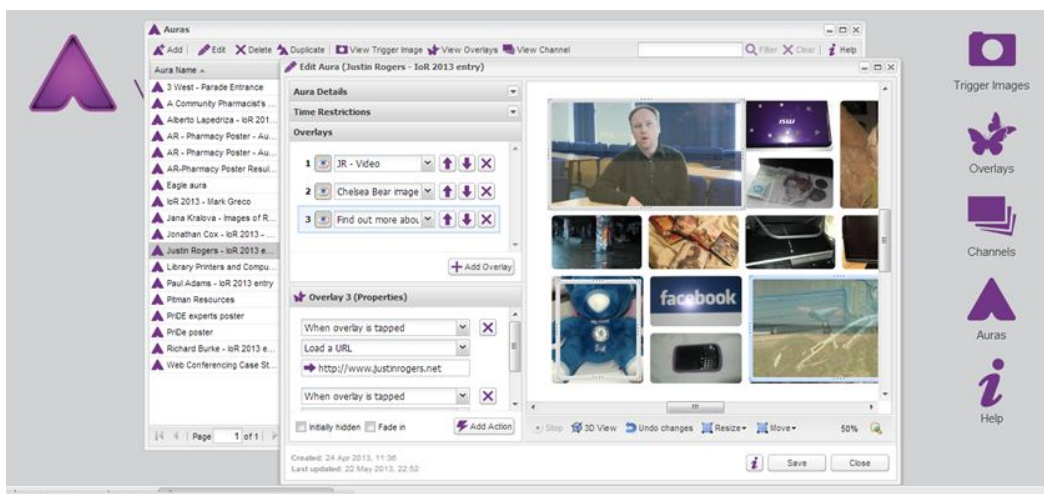


Figure 1: The Aurasma Studio where auras can be created, and where rich media can be attached or added.

5. AR in practice

In choosing our three project strands, we endeavoured to experiment with different aspects of the Aurasma Studio, as well as to meet the needs of different user groups.

The student body initiated the idea of **augmenting the campus**. Students are able to use printers, photocopiers and personal computers (PCs) in a number of buildings across the campus but wanted improved awareness of the locations and availability of these devices without having to enter every building. We were able to utilise the AR technology to link to existing data on PC availability, allowing students to scan a building sign and find out if there was a free PC within the building. Taking this a step further, we also explored the possibility of using Global Positioning System (GPS) coordinates to identify where a student was on campus and to show their nearest PC. Given the compact nature of the University campus, we found that this approach was not particularly successful as the GPS data was not specific or accurate enough to work reliably. We therefore took a second step and 'mapped' the Campus by taking photographic images of the signs of buildings, and these images proved to be more accurate in pinpointing locations in this confined setting.

In the second strand to the project, we explored the possibilities for **augmenting an object**. The University of Bath Library is home to a Victorian printing press. The 1839 Columbian machine was used for fine letterpress printing at Bath's Pitman Press until it was donated to the University in 2007 to accompany the Pitman Collection which the Library holds. Using AR, we identified some trigger points on the actual printer in situ which, when scanned with the Aurasma app, link to various artefacts about the printer, including a link to the Pitman Collection, and a link to a video showing a Columbian Printing Press in operation.

Whilst both these strands proved successful in accomplishing what we had set out to do, it was our experiences with **augmenting research** that had the most impact on its audience. *Images of Research* is an annual event and a public exhibition held across the City of Bath. The aim of the initiative is to give an opportunity for researchers to explain their work using a single image and a short description. This in turn enables the University to extend public engagement activities and to give an insight into the breadth of our research. Importantly, the exhibition showcases how our research activity makes a difference to society and produces real, tangible benefits.



Figure 2: Marie (middle) and Kate (right) demonstrating AR for one of the *Images of Research* entrants, Justin Rogers, Department of Social and Policy Sciences.



Figure 3: Nitin (right) discussing the potential applications of AR with the University of Bath's Vice-Chancellor, Professor Dame Glynis Breakwell DBE DL.

This exhibition has been running successfully for several years and in this last academic year our work with AR played a key role in enhancing what was already a very visual experience for those reading the posters. By placing brief instructions of how to engage with AR on each poster board, people were able to use their iOS and Android devices to access rich media. This included interviews with researchers discussing their work, links with research papers and articles as well as further supplementary material. It is safe to say that this AR initiative certainly captured the imagination and added something different to a popular university exhibition.

6. Next steps

Each new academic year brings new students and new researchers but we have found that even within this changing landscape the appetite for and interest in AR is still strong. As with QR, as awareness of the technology grows it becomes easier to engage others in its use. As we completed these experimental strands we ensured that key decision makers and interested parties across the University were aware of them as real examples of the potential of this technology, and others are now beginning to use it and to make it their own. As an example, our Marketing and Communications department have begun to use it to enhance images across campus, such as on photographs on hoardings shielding building work and in prospectuses. Our researchers continue to engage with the technology when communicating their findings with others, especially in the public arena, and our new Students Union Officers are keen to pick up the mapping of the campus and to develop this further.

What has made this project successful has been our approach of producing practical examples of how AR can be used to great effect and of using these as vehicles to communicate and share our ideas and strategies as widely as possible. This has engaged our University community and has caught the imagination of some of

the major decision-makers across the campus. It is pleasing that our work with AR and the strategies and expertise we developed during this project are continuing through their re-use and further development by others.

Notes

¹ <http://mimas.ac.uk/people/matt-ramirez/>

² <http://www.bath.ac.uk/research/images-of-research/>

References

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